40 MARSHALL STAR

Vol. 39 / Num. 1 | Marshall Space Flight Center | September 2, 1998

Hunting Hurricanes

Marshall's GHCC Scientists Gather the Most Complete Record on One of Nature's Most Destructive Storms

by Tim Tyson

NASA, the National Oceanic and Atmospheric Administration (NOAA), the U.S. Air Force Reserve 53rd Weather Reconnaissance Squadron and university weather researchers examined Hurricane Bonnie from every angle this week, and have gathered the most complete dossier ever recorded on the ocean's most destructive of storms.

"This is a one-of-a-kind data set that will take a long time to reproduce," said Robbie Hood, mission scientist from the Global Hydrology and Climate Center (GHCC) at Marshall. The hurricane study uses NASA's ability to gather weather readings using state-of-the-art remote sensing technology never before collected above 30,000 feet.

"This is a powerful data set that will help NOAA in its predictions of intensity and direction to help save lives and money."

— Robbie Hood, *mission scientist from the GHCC at Marshall*

A research team of scientists, with five research and operational aircraft, looked at Bonnie from almost every angle. "We studied the atmosphere in front of this very large hurricane, spent two days flying through Bonnie's eye wall out at sea, and then caught her in a landfall situation," Hood said. "It was our sheer luck to be able to catch the storm in many

*See **Hurricanes** on page 3*

NASA photo

Astronaut John Glenn to Perform Marshall-Managed Microgravity Experiments

To prepare for his duties on the next U.S. Space Shuttle mission, STS-95, set Oct. 29, veteran space traveler John Glenn, left, trained with microgravity scientist Ray Cronise, center, of Marshall Center's Space Science Laboratory and Bill Powell, right, of Marshall's Space Products Development Office. In one of his assigned experiments, Glenn will mix samples of a foam-like material called "Aerogel" — a tremendous insulator. This extremely light-weight material has many potential applications in industry and space travel. The Aerogel experiment is sponsored by the Space Product Development Office of the Microgravity Research Program at Marshall. Dr. David Noever of the Space Sciences Laboratory is the experiment's principal investigator.

Engineer's Heroic Efforts Result in Lives Saved

by Peter Cobun

He says, "There's nothing special about me. I'm just an almost-middle-aged Marshall engineer who's not in great shape."

Robert Champion's wife, Maria, agrees — but with a very significant caveat: "My husband is an ordinary man who performed an extraordinary deed."

A lot of folks agree with Maria Champion. Come next month, Robert Champion will be honored by a pharmaceutical company for his extraordinary deed — saving two children and a man from drowning off the Alabama coast.

Champion, a 34-year-old, self-effacing Marshall aerospace engineer, leads a Propulsion Laboratory team charged with designing the X-34's main propulsion system. In early April, he took a long, weekend break from the intricacies of getting NASA's future reusable launch vehicle into space, and headed to Gulf Shores with his family.

Relaxing at the water's edge, keeping a close eye on his three children frolicking knee-deep in the rough, unseasonably cold ocean, Champion noticed four young boys in deep water, about 40 yards out. It was a few moments later when a woman came to the shoreline, motioning for the children to move closer to the beach. All the while, they drifted farther and farther out.

Down shore from Champion, people began to gather, peering out at the bobbing children. A woman suddenly called for help. As Champion ran toward the gathering, one child made it back ashore.

*See **Rescue** on page 5*

Safety Awareness Week Sept. 21-25

Activities at Center to Focus On Safety at All Levels

Safety Awareness Week — being celebrated at Marshall Center Sept. 21-25 — will include a variety of safety-related activities with the focus on employee awareness and accountability for flight safety, industrial safety and personnel safety.

Daily "Lunch-n-Learn" sessions are planned for each day of the observance in Bldg. 4200, Morris Auditorium, with topics including Dennis Fitch's true-life story of piloting United Flight 232, "The Unflyable Airplane" into Sioux City, Iowa.

Other guests speakers will offer Marshall employees practical advice on home safety, driving safety, boating safety and building tornado shelters inside the home.

Safety Day Sept. 23

Acting Center Director Carolyn Griner has called for a work stand-down Wednesday, Sept. 23 and Marshall will dedicate an entire day to safety, according to Robert McBrayer, co-chairman for Marshall's Safety Awareness Week activities. With the exception of mandatory services — such as fire, security and cafeterias — all work will be suspended to allow Center personnel to attend Safety Day activities.

The day's events will kickoff in Morris Auditorium with a program that will feature keynote speaker Fred Gregory, associate administrator of the Office of Safety and Mission Assurance at NASA Headquarters and former astronaut.

Throughout the day, visiting astronauts and Center managers will participate in informal tours of the Center, and employees may view local safety vendors' displays promoting and educating employees on health and safety products.

Employees will have planned organizational activities, and will be challenged to consider how their job duties affect the safety of flight hardware, how their work environment could be safer, and how to improve their personnel safety.

NASA photo by Emmett Given

Center Welcomes Bromberg and ASAP Members

Acting Center Director Carolyn Griner welcomed the Aerospace Safety Advisory Panel (ASAP) to Marshall last week. Richard Bromberg, ASAP chairman, and other members received an overview on the safety aspect of major NASA programs.

Arnold Named Acting Director of Global Hydrology Research Office

Ray Arnold, deputy director of the Global Hydrology Research Office at Marshall, has been appointed acting director of that office. He assumes the duties held by Dr. Lawrence Greenwood who retired from Marshall Aug. 1.

First Fastrac Full-Engine Firing Is Scheduled for October

The first full-engine test firing of the Fastrac engine is planned in October. The new, low-cost engine — scheduled to power the X-34 technology demonstrator — was designed and developed by Marshall scientists and engineers.

The 60,000-pound-thrust engine, fueled by a mixture of kerosene and liquid oxygen, is only the second space launch engine developed in the United States in the last 25 years. After successful component testing at Marshall, the first engine was assembled and shipped to Stennis Space Center, Miss., in early August. Full-engine testing begins at Stennis in mid-October and is scheduled to continue through August 1999. Fastrac turbopump and thrust chamber assembly testing continues at Marshall. More information about the Advanced Space Transportation Program at Marshall may be found at the following Web site: http://stp.msfc.nasa.gov

NASA photo by Emmett Given

Cramer Briefed At Marshall

U.S. Rep. Bud Cramer, left, is briefed Monday on Marshall's Space Transportation Program by Planning and Operations Office Manager Dennis Smith. Cramer met with Acting Center Director Carolyn Griner and also was briefed on the Microgravity Research Program.

Hurricanes

Continued from page 1

different phases. This is a powerful data set that will help NOAA in its predictions of intensity and direction to help save lives and money."

NOAA estimates that it costs $1 million a mile to evacuate U.S. coastline. NASA and NOAA believe that the study results could possibly lead to an increase in forecast accuracy in the coming hurricane seasons.

The highly coordinated effort brought together a specially equipped NASA ER-2 aircraft soaring above Bonnie at 65,000 feet, and a converted NASA DC-8 jetliner that flew into the eye of the hurricane between 30,000 and 39,000 feet. NOAA flew PS Orion turboprops into the heart of the storm at altitudes of 5,000 to 15,000 feet, and the U.S. Air Force sent a C-130 reconnaissance airplane into Bonnie's cyclonic winds. The NASA aircraft were provided by the Dryden Flight Research Center, Calif.

"We developed a fantastic working relationship and were extremely fortunate to have had NOAA working with us in the study," Hood said of the combined government agency campaign.

"Perhaps the most interesting thing about Bonnie is the thing that didn't happen," said Dr. Ed Zipser, a lead scientist from Texas A&M University. Bonnie had developed two eye walls, a typical eye, and then an outer wall that ranged from 100 to 200 miles in diameter. "The large outer wall should have contracted and intensified, and we don't understand why not. It's one of the most important questions we'll have to go and answer," Zipser said.

Had the cyclonic winds at the outer wall spun tighter, causing it to overtake the inner eye, "we should have had something like a Hurricane Andrew," Zipser added.

"This is certainly the most complete data set that we've ever had of a hurricane, any one day would have been the most complete, but we had three days … this is quite incredible," Zipser said. The thorough investigation of the nation's first hurricane of the 1998 season included overflights of the Tropical Rainfall Measurement Mission (TRMM) satellite.

> ***Had the cyclonic winds at the outer wall spun tighter, causing it to overtake the inner eye, "we should have had something like a Hurricane Andrew."***
>
> ***— Dr. Ed Zipser,***
> *a lead scientist from Texas A&M University*

Launched in November 1997, Tropical Rainfall Measuring Mission satellite is a joint NASA and Japanese Space Agency mission to measure rainfall 35 degrees above and below the equator.

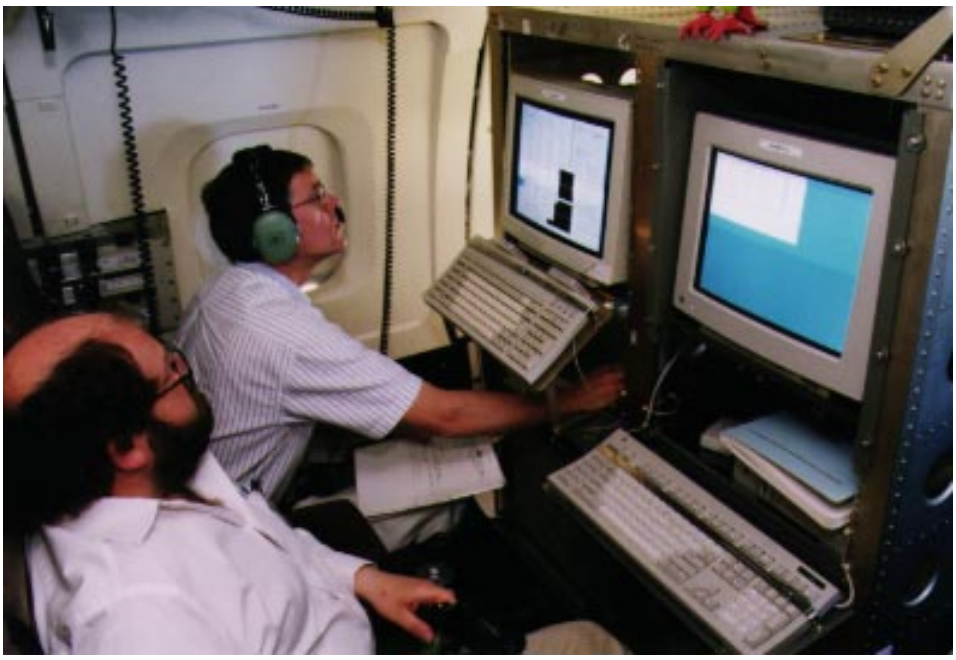
Hurricane Bonnie crossed the satellite track several times as it approached the U.S. coastline. Perhaps the most critical observations came when TRMM made three passes over the storm as the storm made landfall. "The NASA TRMM satellite and the instruments on the NASA airplanes are exactly those we want to evaluate to see if they help us forecast hurricane track changes and intensity changes," according to Zipser.

TRMM is managed by Goddard Space Flight Center in Greenbelt, Md.

Twice Bonnie slowed or stalled in what typically would have been a pre-intensification sign, but did not intensify "due largely to the eye wall phenomenon," Hood said. Zipser agreed, adding that "One of the potential clues to the lack of deepening or intensification over the last three days might turn out to be the lack of really intense convective storms, and if that's the case then the most the most important information from TRMM's lightning imaging sensor is the fact that there was no lightning. We think that if there is lightning in the eye wall of a storm then that is a case of intensification."

"I think we are on the era of what I hope will be a well organized national weather research program because NASA, NOAA, the science foundation, and the university community have shown they can cooperate in a multi-agency, multi-aircraft mission and I think that holds great promise," Zipser said.

The hurricane research program is to continue until Sept. 23.



NASA photo by Bill Ingalls

Dr. Jeffry Rothermel, right, from Marshall's Global Hydrology and Climate Center (GHCC), and Dr. David Tratt from the Jet Propulsion Laboratory, Pasadena, Calif., take readings from the Multicenter Airborne Coherent Atmospheric Wind Sensor aboard a NASA DC-8 aircraft during flights to study Atlantic hurricanes in the CAMEX-3 program. Rothermel is principal investigator for the experiment. The CAMEX-3 program, to measure high-altitude wind steering currents and hurricane intensity, is being coordinated by Marshall's GHCC.

Upcoming Events

Griner to Hold Employee Feedback Meetings Sept. 3, 8 and 9 at Marshall

Acting Center Director Carolyn Griner says she is ready to listen to employee reaction to the thoughts she shared at a recent series of town meetings.

Employee Feedback Meetings will be held 1:30-3 p.m.: Sept. 3 in Bldg. 4203, room 4002, seating capacity is 50; Sept. 8 in Bldg. 4610, room 1054, seating capacity is 50; and Sept. 9 in Bldg. 4666, room 371-H, seating capacity is 40.

All-Hands Meeting Set for 10 a.m. Tuesday, Sept. 15 in Morris Auditorium

An All-Hands Meeting will be held at 10 a.m. Tuesday, Sept. 15, in Bldg. 4200, Morris Auditorium. Employees who are unable to attend may view the meeting on Centerwide closed-circuit television.

Balancing a Successful Career With a Fulfilling Life is Seminar Topic Sept. 29

The Employee and Organizational Development Office (EDTeC) is sponsoring via satellite "Balancing a Successful Career with a Fulfilling Life" 12:30-2 p.m. Tuesday, Sept. 29, in Bldg. 4200, room G-13. The seminar also is scheduled for broadcast on the Marshall Continual Learning Channel 14.

Registration is necessary to receive course credit and a participant notebook. Enrollment is limited and the registration deadline is 4:30 p.m. Sept. 17. Employees may register via AdminSTAR. For more information call the EDTeC at 544-3343.

Obituaries

Boykin, Nell, 72, Huntsville, died July 27. Boykin retired from Marshall in 1971 and worked as a management technician.

Fife, James, 78, Fayetteville, Tenn., died Aug. 9. He retired from Marshall in 1989 where he worked as an electronics technician. He is survived by his wife Ruth Fife.

Franklin, Elmer, 72, New Market, Ala., died July 4. He retired from Marshall in 1981 where he worked as a laborer leader. He is survived by his wife Pauline Franklin.

Gore, William, 64, Hazel Green, Ala., died July 11. He retired from Marshall in 1990 where he worked in engineering and integration. He is survived by his wife Mary Gore.

Hill, Ewing, 64, Huntsville, died Feb. 12. He retired from Marshall in 1988 where he worked as an aerospace engineer.

McElrath, Henry "Pat," 87, Huntsville, died Aug. 8. He retired from Marshall in 1973 where he worked in experimental facilities and equipment. He is survived by his wife Floy McElrath.

Reece, Orvil, 78, Huntsville, died Aug. 10. He retired from Marshall in 1980 where he worked on the Space Shuttle solid rocket booster. He is survived by his wife Mary Howell Reece.

Wade, Stanley, 80, Athens, Ga., died May 18. He retired from Marshall in 1979 where he worked in technical management systems.

Now Available from the U.S. Treasury

New Bond Honoring General Marshall

Gen. George C. Marshall

Eight Americans representing the diversity that built this country, made it what it is today, and will take it into the future are honored on the new I bonds now offered from the U.S. Treasury. Included is Gen. George C. Marshall whose portrait appears on the $500 bond. The Marshall Center bears the name of General Marshall.

The U.S. Treasury is offering the new type of savings bond designed for investors seeking to protect the purchasing power of their investment along with a guaranteed real rate of return. Beginning Sept. 1, six denominations will be available for purchase through Edwina Bressette in Marshall's Human Resources Office, 544-8115, or financial institutions across the country. Portraits of the following prominent Americans will appear on the eight I bond demoninations:

- **$50-Helen Keller:** Noted author and advocate for people with disabilities; responsible for Braille becoming the standard for printed communications with the blind.
- **$75-Dr. Hector P. Garcia:** Physician; leading advocate for Mexican-American veterans's rights; activist in Latino civil rights movement and founder of the American G.I. Forum.
- **$100-Dr. Martin Luther King Jr.:** Prominent civil rights leader, minister and Nobel Peace Prize recipient.
- **$200-Chief Joseph:** Nez Perce chief and great Native-American leader.
- **$500- Gen. George C. Marshall:** U.S. Army Chief of Staff during World War II; Secretary of State; Secretary of Defense and Nobel Peace Prize recipient. As a result of Marshall's wartime experience — enabling him to appreciate the problems of peace stemming from the impact of scientific and technological developments — President Dwight Eisenhower named the NASA facilities in Huntsville is his honor.
- **$1,000-Albert Einstein:** Physicist; author of the Theory of Relativity; Nobel Peace Prize recipient for physics.
- **$5,000-Marian Anderson:** World-reknown vocalist and first African-American to sing with the Metropolitan Opera.
- **$10,000-Spark Matsunaga:** U.S. senator and congressman; World War II hero; obtained redress for survivors of World War II internment camps.

The $200 and $10,000 denominations will not be available prior to May 1999.

I bonds are an accrual-type security — meaning interest is added to the bond monthly and paid when the bond is cashed. I bonds, sold at face value, grow in value with inflation-indexed earnings for up to 30 years. Investors are being offered a bond with a fixed rate combined with semiannual inflation adjustments that will help protect purchasing power. The I bond does not replace Series EE bonds; both will be on sale to give investors a choice. More information about savings bonds may be found at the following Web site: www.savingsbonds.gov

Rescue

Continued from page 1

Intuitively, or maybe impulsively, Champion raced into the water, and another man joined him. The man reached a child, and gradually worked toward land. Champion reached another boy who had gone under at least four times. "I grabbed his arms and pulled him up so he could get a big breath of air," remembers Champion. "He was conscious enough to hold onto my arm, but he was extremely tired and weak. I began swimming to shore."

> ***"We weren't making quick enough progress, so I began lifting the child up so he could get air, then I would shove him toward shore."***
>
> ***— Robert Champion,***
> *aerospace engineer at Marshall*

It was about this time that realization overcame Champion, realization of just how frigid the Gulf's waters were, realization that all this was draining his strength. "We weren't making quick enough progress, so I began lifting the child up so he could get air, then I would shove him toward shore. I kept repeating that process, inching closer and closer to the beach. It was not the real professional way to do it, but it worked."

Another man had rushed past Champion into the waters to retrieve the fourth boy, by now pulled more than 80 yards offshore by the current. The child Champion had rescued was being swaddled in warm towels and comforted by people on the beach. But as he collected himself, Champion sensed the man after the fourth boy was himself in trouble. "He's a trained paramedic," the man's wife said assuredly. "He's all right. He's just waving at us."

He's waving because he needs help, Champion said silently to himself.

The Marshall engineer appealed to the now-large crowd for someone to rescue the man and the boy. No one volunteered.

Robert Champion headed back into the frigid sea. Out 50 yards into the sea, when he could barely touch bottom, Champion was knocked down and under by the unrelenting waves. "I went back out to help that man and boy. Not really wanting to, because at this point I realized just how dangerous it really was. But I don't know. I just did it."

Champion pulled himself back up from the waves' grasp, to realize that yet another man had mercifully reached the paramedic and the boy. The man struggled with both until he could reach Champion. He handed over the paramedic to Champion, and he clutched the child. They would all safely reach shore, soon teeming with rescue squads and equipment. Even lifeguards had shown up from somewhere down the beach.

His adrenaline spent, his emotions welled, Robert Champion — this ordinary man who had just performed some extraordinary deeds — looked around him at the children and the man being examined by medical crews.

NASA photo by Dennis Olive

Robert Champion, the Marshall aerospace engineer who saved three people from drowning off the Alabama coast, with his wife Maria and their children, from left, Beth, Robbie and Aubrey.

And he began to sob.

Champion — raised in Alabama's Bibb County, in a place where the road widens called Woodstock, near the towns of Frog Level, Greenpond and Red Eagle — always wanted to be an engineer in the space program. He helped to pay his way through Auburn University delivering pizzas nights and weekends. And when he graduated in 1986, he came directly to the Marshall Space Flight Center to work in America's space program. That was the culmination, the fulfillment, of Robert Champion's professional dream.

But in the Champion household, "Daddy" has become more than an aerospace engineer preparing America for the next generation of space travel and exploration. "Daddy's" become a hero. His 7-year-old daughter Beth drew a picture of her father performing his heroic efforts on the beach of Gulf Shores. And Maria Champion wrote the company that rewards people who act quickly to change someone's life. Her husband changed three lives.

He'll be going to New York in late October to receive his reward, part of which will be donated to the charity of his choice — a foundation that fights juvenile rheumatoid arthritis. The Champions know two teen-agers who suffer from the disease.

That's two more people touched by this "ordinary" man.

Employee Ads

Miscellaneous

★ Alabama vs. Brigham Young University football tickets for Sept. 5, 3 tickets, $26 ea. 881-3703
★ Auburn vs. Virginia football tickets, 2 tickets, $50 for pair. 722-9114
★ Fender Telecaster guitar and Fender Princeton chorus amplifier, $600 firm. 880-7660
★ 1997 Yamaha jet ski, Waverunner, GP760, yellow/white, $5,900. 837-2461
★ GE refrigerator, 24.7 cu. ft. top freezer, ice through door, almond, $575; Whirlpool washer and dryer, $100 ea. 881-6040
★ King-size waterbed with bookcase headboard, 12-drawer pedestal, padded rails, $300. 880-2001
★ Sega Gamegear games and accessories; Gameboy games and accessories. 852-0142
★ Sofa, $35; two matching chairs, $25; Frigidaire stovetop/ventilator, $10; decorative curtain rods, $10. 881-1249
★ Barbie jeep and Power Wheels quad racer. 233-5376 after 6 p.m.
★ Personal water craft, $450; Kenmore heavy-duty washer, $100. 881-2574
★ Persian kittens, 2 blue, 1 blue point, 4 weeks old, ready soon, $250. 498-0629
★ NordicTrack Walkfit 5500, $250 obo. 883-5543
★ Ludwig snare drum with stand, case, sticks, music, $95. 881-4748
★ Sharp lap-top computer, double-disk drive, 640K, $200 obo. 828-6158

Vehicles

★ 1988 Oldsmobile, 98 Brougham, white, 108K miles, $3,200. 461-4816
★ 1982 Buick LeSabre Custom, 188K miles, A/C, slight transmission leak, $800. 852-0928 after 6 p.m.
★ 1985 Pontiac Fiero SE, 6-cyl., black, 191K miles, AM/FM, A/C, $2,000. 776-2005 or 651-6337
★ 1985 Harley Davidson motorcycle, FXTR, full touring package, Evolution engine, $9,500. 534-8186
★ 1992 Ford F-150 pickup, long bed, PW/PDL, 119K miles, $7,000 obo. 533-9198
★ 1992 Nissan pickup, automatic, A/C, 78K miles, white/maroon, cloth seat, bed liner, $5,800. 880-9025
★ 1983 Taruco 31' motor home. 536-0672
★ 1981 Honda motorcycle, CBX, 6-cyl., $4,250. 837-6109
★ 1986 Toyota Celica GT, 64K miles, 5-spd., A/C, $3,995. 881-8970

Free

★ Female cat, 3 years old, declawed and spayed. 729-8397
★ To good home, multi-color, spayed, female Chihuahua-mix, 5 years old. 650-3163

Center Announcements

☛ ***Emergency Warning System Test —*** The monthly test of the Emergency Warning System at Marshall is scheduled for 3 p.m. Thursday. This is an audio test only, and employees should not evacuate to protective areas. If severe weather is occurring at this time, the test will be rescheduled to a later date. Safety coordinators and monitors should send reports of malfunctioning speakers to: AB11/Emergency Preparedness Officer at 544-5187 as soon as possible.

☛ ***Vacation Travel Office —*** The American Express Vacation Travel Office in Bldg. 4203, room 1109C, will be closed Sept. 3, 4 and 8. The vacation office will reopen Wednesday, Sept. 9. **Contact:** American Express Travel Office, 544-3946.

☛ ***MSAA —*** The Mississippi State Alumni Association (MSAA) is sponsoring an Alumni and Friends Dinner Sept. 3 at Valley Hill Country Club. **Contact:** Karen Dugard, 830-9065 or Jim Ward, 883-9462

☛ ***Full Cost Training —*** Full Cost training for Center employees is set for 8 a.m.-4:30 p.m. Sept. 9 and 23 at the Sparkman Center in Bldg. 5304. Employees may register for the eight-hour training via AdminSTAR. **Contact:** LaVerta McGlathery, 544-7560

☛ ***MARS Ballroom Dance Club —*** The MARS Ballroom Dance Club will offer bolero and samba lessons from 7-8 p.m. Sept. 14, 21, 28 and Oct. 5 in the Parish Hall at St. Stephen's Episcopal Church, 8020 Whitesburg Drive. Lessons are available to MARS Ballroom Dance Club members and partners/guests. **Contact:** Pat Sage, 544-5427

☛ ***MARS Fishing Club —*** All NASA employees, family members and on-site contractors are invited to participate in a fishing tournament Saturday, Sept. 5, at First Creek. A boat and experience is not required. **Contact:** John Pea, 544-8437, Don McQueen, 544-9073 or Charlie Nola, 544-6367

Job Opportunities

CPP 98-110-JB, Program Analyst, GS-343-7, Space Shuttle Projects Office, Space Shuttle Main Engine Project, Business Management Office. Closes Sept. 2.

CPP 98-115-CL, Computer Specialist, GS-334-13, Center Operations Directorate, Information Systems Services Office, Operations Division. Closes Sept. 8.

CPP 98-125-RE, AST, Liquid Propulsion Systems, GS-861-14, S&E, Propulsion Laboratory, Mechanical Design Division, Propulsion Systems Design Branch. Closes Sept. 9.

CPP 98-134-CL, Environmental Management Specialist, GS-301-13, Environmental Engineering & Management Office, Center Operations Directorate. Closes Sept. 11.

CPP 98-128-CP, AST, Flight Systems Test, GS-861-14, S&E, SA&I Laboratory, Systems Test Division, Development & Environmental Test Branch. Closes Sept. 11.

CPP 98-114-CL, Physical Security Specialist, GS-080-13, Protective Services Office, Center Operations Directorate. Closes Sept. 11.

CPP 98-126-DC, Supv. AST, Optical Physics, GS-1310-15, S&E, Astrionics Laboratory, Optics Division. Closes Sept. 4.

CPP 98-129-CL, AST, Technical Management, GS-801-14, Technology Transfer Office, Customer & Employee Relations Directorate. Closes Sept. 11.

CPP 98-122-CL, Supv. AST, Technical Management, GS-801-14, Technology Transfer Office, Customer & Employee Relations Directorate. Closes Sept. 4**CPP 98-130-CP, AST, Flight Systems Test, GS-861-14,** S&E, SA&I Laboratory, Systems Test Division, Vacuum Engineering Test Branch. Closes Sept. 15.

CPP 98-119-JB, Supply Management Officer, GS-2003-14, Center Operations Directorate, Logistics Services Office, Property Management Division. Closes Sept. 9.

MARSHALL STAR

Marshall Space Flight Center, Alabama 35812

The Marshall Star is published every Wednesday by the Internal Relations and Communications Office at the George C. Marshall Space Flight Center, National Aeronautics and Space Administration. Contributions should be submitted no later than Friday noon to the Marshall Internal Relations and Communications Office (CO40), Bldg. 4200, room 101. Submissions should be written legibly and include the originator's name. Send electronic mail submissions to: ann.bryk@msfc.nasa.gov The Marshall Star does not publish commercial advertising of any kind.

Director of Internal Relations
and Communications — Norman Brown
Managing Editor — Angela D. Storey
Writer-Editor — Ann Marie Bryk

NASA at Marshall Space Flight Center may be found at the following Web site: http://www.msfc.nasa.gov

U.S. Government Printing Office 1998-633-111-80025

BULK RATE
Postage & Fees PAID
NASA
Permit No. G-27